MINISTRY OF ENVIRONMENT
PROVINCE OF BRITISH COLUMBIA

CHEMICAL SENSITIVITY OF LAKES IN BRITISH COLUMBIA TO ACIDIC INPUTS

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This first summary document of the chemical sensitivity of lakes in British Columbia provides information on about 700 lakes sampled in the period 1977-1985. The biological sensitivity of lakes is more complex, because it is influenced by numerous biological factors not measured during the surveys reported here.

The purpose of this document is to provide information on the status of lakes in British Columbia with respect to acidic inputs. Acidic inputs do not originate necessarily as acid precipitation, but also can originate as acidic waste water effluents discharged from industrial operations.

The information in this document relates solely to lakes and does not reflect river water quality. The reasons for this are:

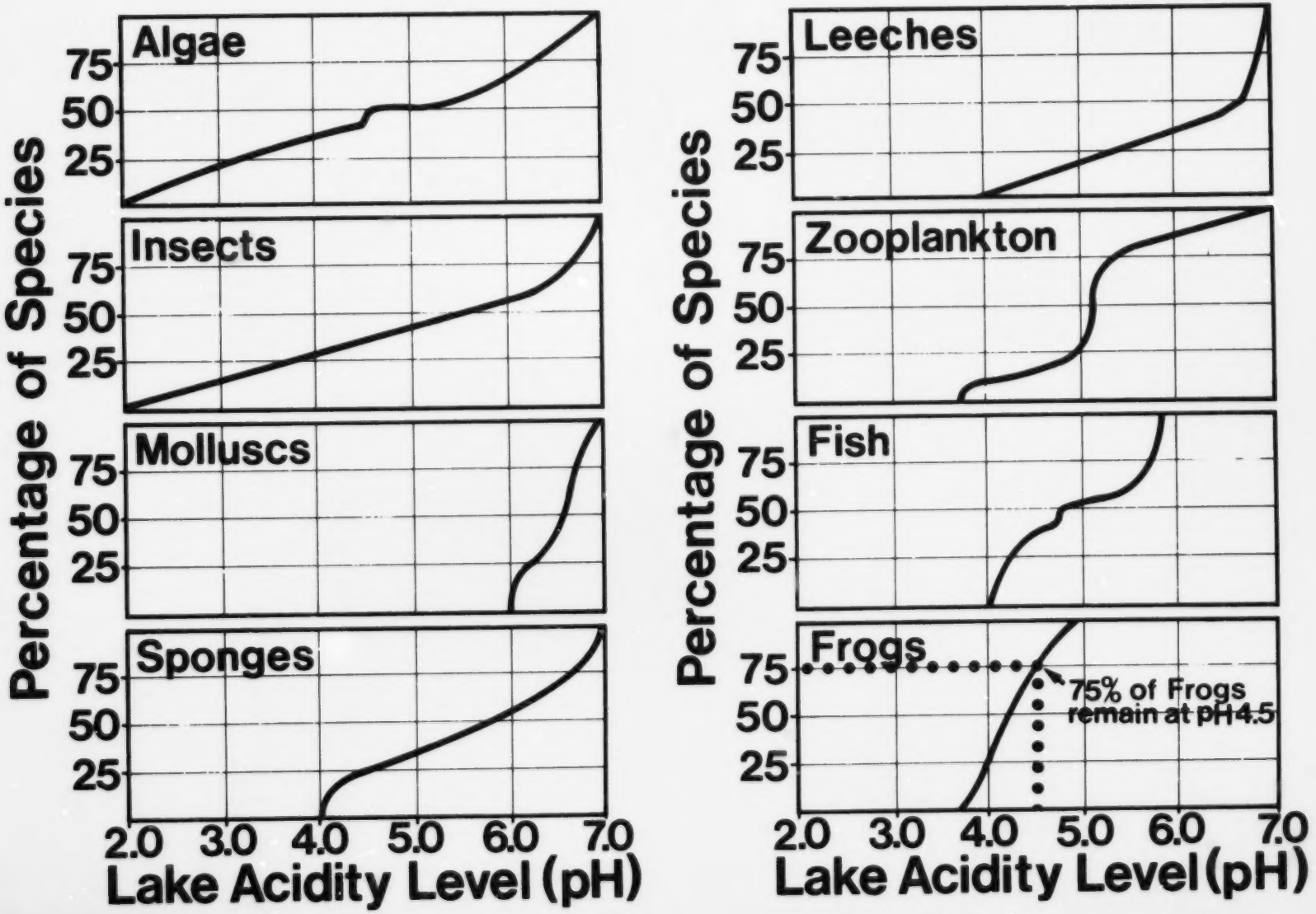
1. Rivers and streams can reflect recent events such as snowmelt. An accurate representation of the water quality of a river or stream is not possible unless a large number of samples are obtained in one season.
2. Lakes provide a zone in a watershed where short-term events such as snowmelt can be averaged out. This reduces the necessity to collect samples as frequently as would be the case for rivers and streams.
3. The water quality of rivers and streams can vary along their length more than lakes, due to the heterogeneous geological nature of drainage basins.

Acidic inputs to a lake can cause the lake to increase in acidity. The acidity of any substance can be measured on the pH scale, which has values ranging from 0.0 to 14.0. The scale is divided equally between acidic and basic conditions; values less than pH 7.0 are acidic while those greater than pH 7.0 are basic. Vinegar has a pH of 2.2, while milk of magnesia has a pH of 10.5.

The acidity of a lake has a direct impact on the numbers and types of aquatic organisms present. This is illustrated in Figure 1, which shows that 100% of fish will be present at pH 6.0, but less than 50% of leeches. All freshwater molluscs will disappear at this same pH.

FIGURE 1

Percentage of species able to exist at various lake acidity levels.



In British Columbia, most of the 700 lakes where pH measurements have been made have pH values greater than 6.0. Figure 2 represents the percentage of values in each pH range. Only about 1% of the 700 lakes have had pH values less than 6.0. The locations of these lakes are shown in Figure 3. The lakes are distributed throughout British Columbia, from the Queen Charlotte Islands and Prince Rupert area to the Wells Gray Park area (Haggen #1 in Figure 3).

The biological effect that any acidic input will have on a lake will depend upon several factors. These factors include the number and type of aquatic organisms present, the quantity of acid which reaches the lake, the degree of neutralization of the acid which occurs prior to its reaching the lake, and the chemical sensitivity of the lake to pH change. The chemical sensitivity of a lake to acidic inputs relates to the quantity of buffering material present in the lake to neutralize incoming acids. A lake of high chemical sensitivity has little capability to provide buffering, while one of low sensitivity has sufficient buffering material present to neutralize most acidic inputs. A lake with moderate sensitivity can neutralize all but fairly large acidic inputs.

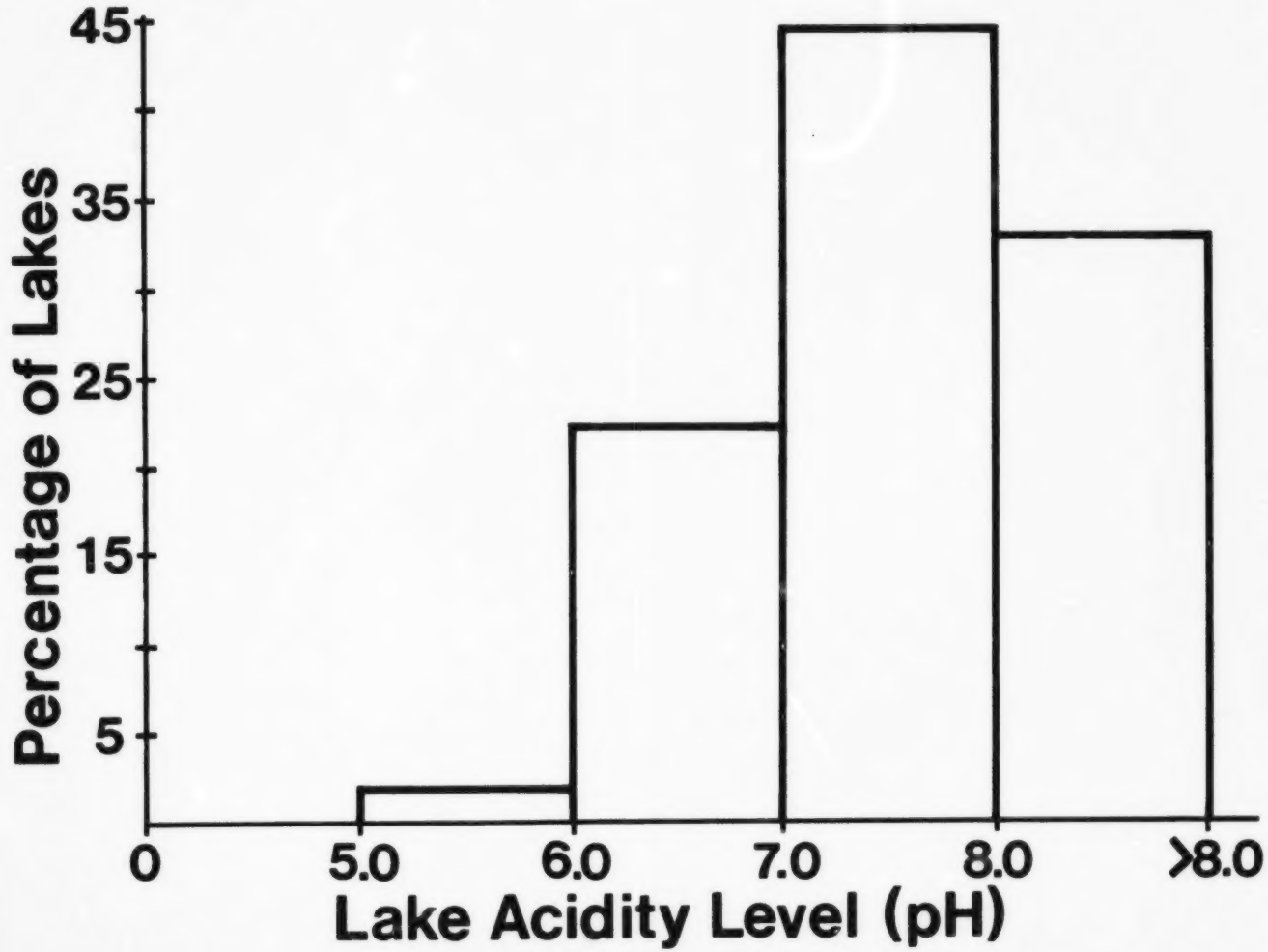
In British Columbia, lake sensitivity is determined from measurements of the alkalinity and/or calcium present. Measurements of these characteristics were made at the Environmental Laboratory of the Ministry of Environment in Vancouver. Alkalinity provides the most direct measurement of sensitivity of a lake to acidic inputs, since it measures the carbonate-bicarbonate buffering capacity. These anions generally are in equilibrium with calcium and magnesium cations. In British Columbia, the chemical sensitivity of lakes is determined according to the following criteria for alkalinity and calcium.

	Sensitivity		
	High	Moderate	Low
Calcium	< 4	4 - 8	> 8
Alkalinity	<10	10 - 20	>20

These criteria are consistent across Western Canada (Saskatchewan Research Council, 1982).

FIGURE 2

Lake acidity levels in British Columbia (n=707).



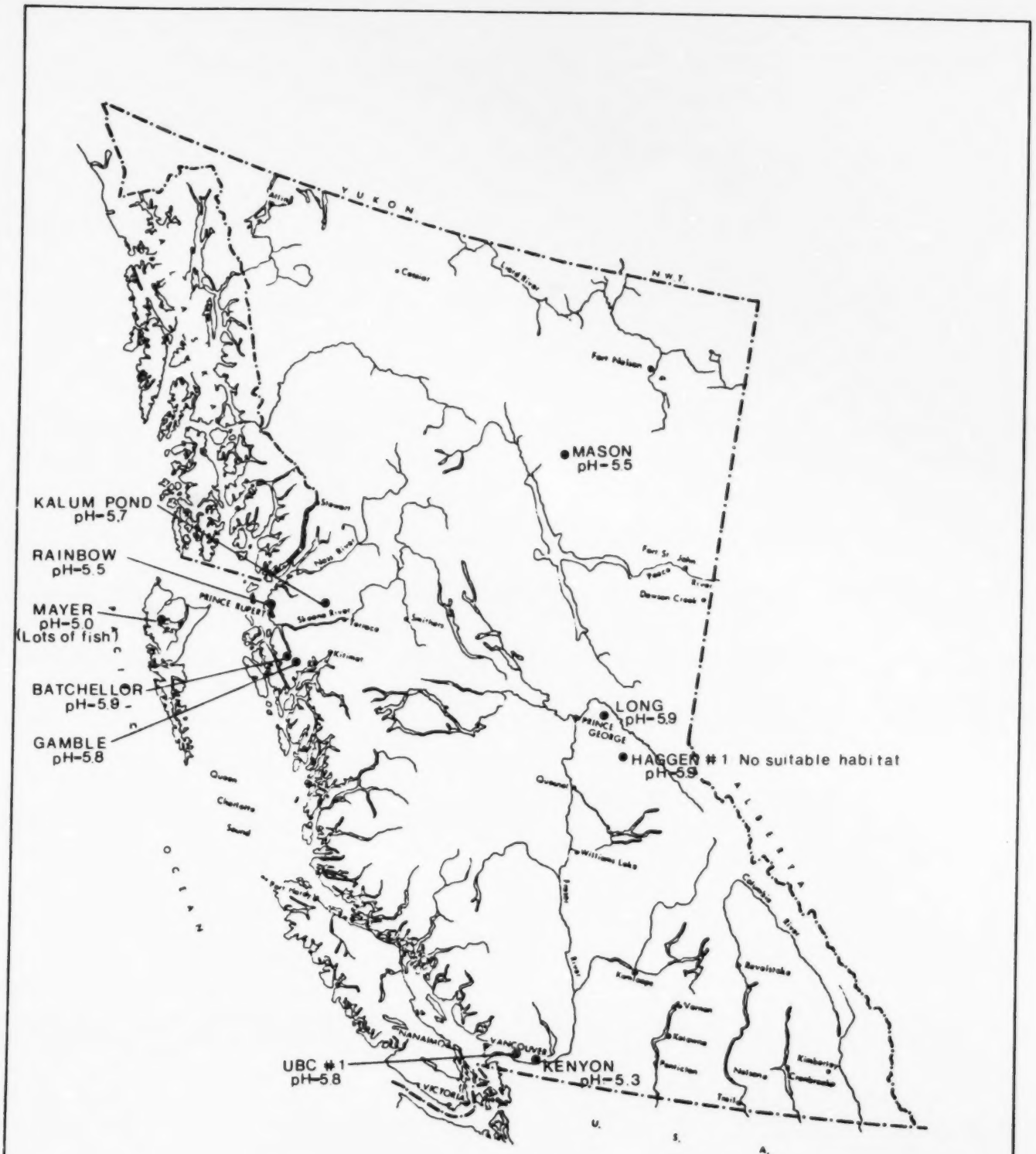


Figure 3 Lakes With pH< 6.0

Using these criteria, a lake sensitivity map (Figure 4) for British Columbia was prepared using data collected form 1977 to 1983. The preparation of this map initially required that two sensitivity maps based on calcium and alkalinity measurements had to be prepared. A third and final map was produced by overlaying the first two maps (Figure 4). The final map depicts the most sensitive rating from either of the initial maps, i.e. an area of high sensitivity on either map became an area of high sensitivity on the final map, an area of moderate and low sensitivity on the two initial maps became an area of moderate sensitivity on the final map.

Figure 5 shows the distribution of lakes according to calcium and alkalinity measurements for the period 1977 to 1985. Over 65% of all lakes sampled have low sensitivity, about 15% have moderate sensitivity and nearly 20% have high sensitivity.

Details related to the pH and sensitivity of each lake sampled in the period 1977 to 1985 are in the following table. Lakes are listed alphabetically and have been grouped according to their location by Ministry of Environment region (Figure 6) because of duplication of some lake names within the Province. When calcium and/or alkalinity values are not available for a lake, the sensitivity has been estimated from the lake pH. This estimate has been made according to the region that the lake is located in and by data for other lakes in the same region with similar pH and known calcium and/or alkalinity.

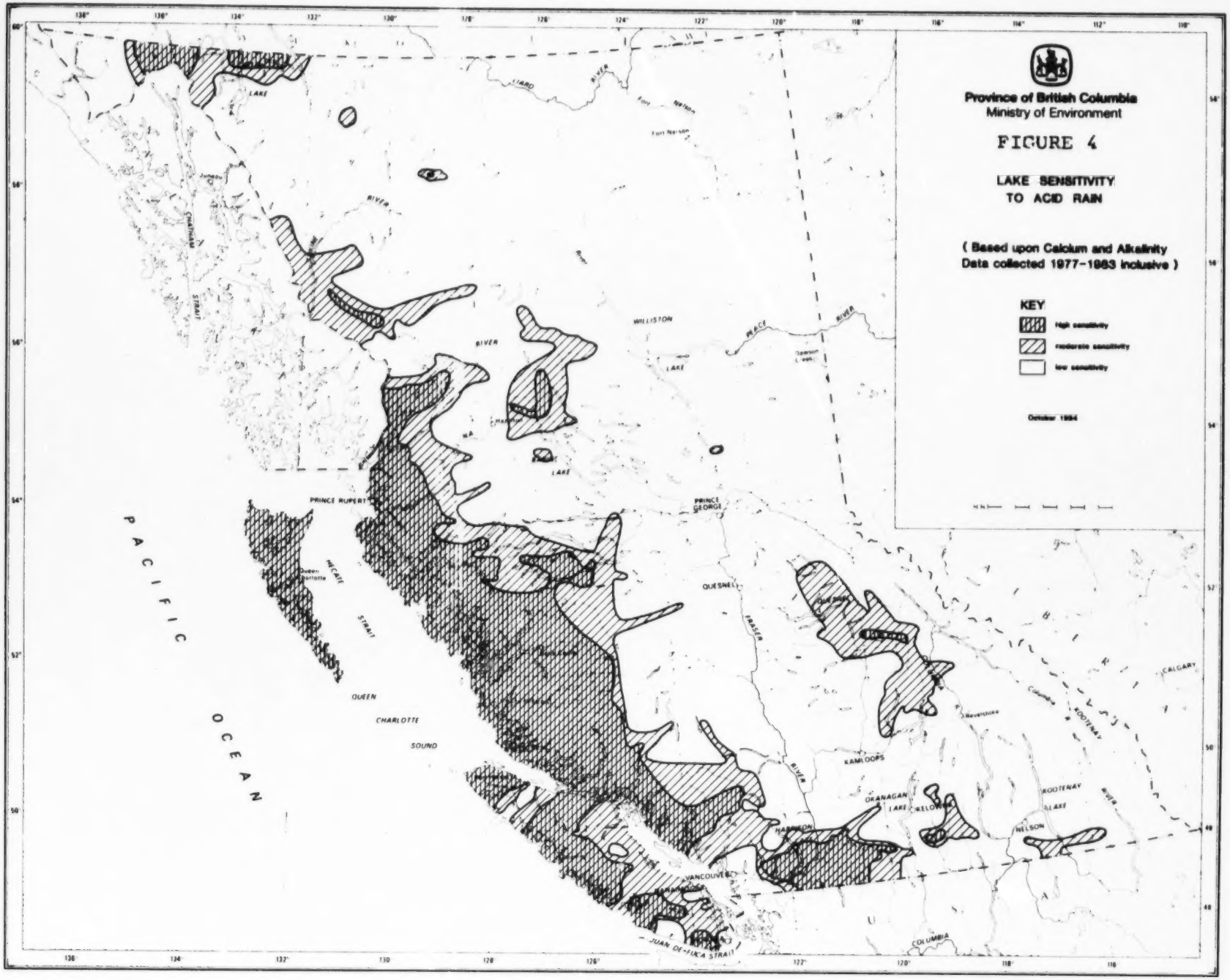
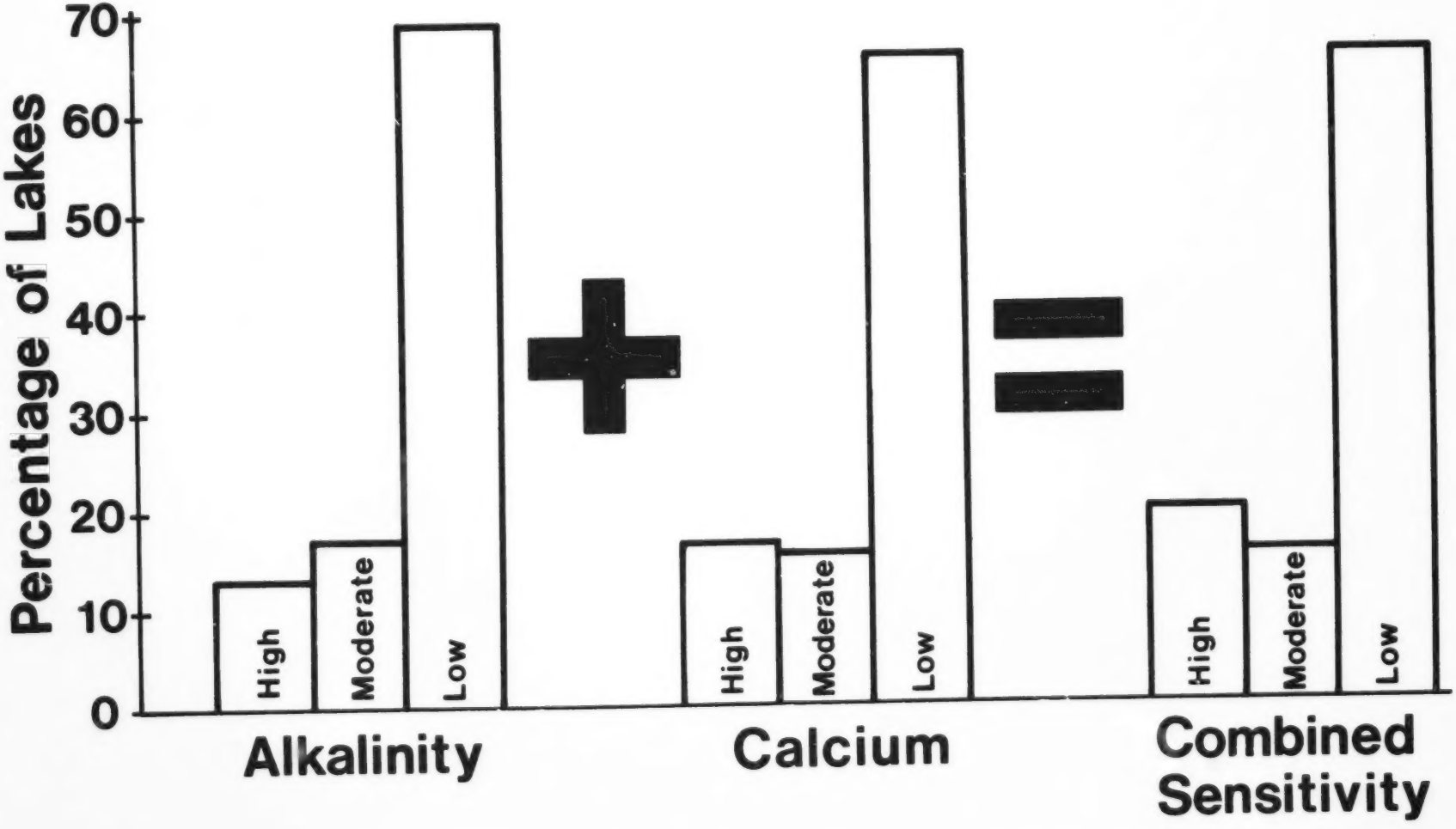

Province of British Columbia
Ministry of Environment
FIGURE 4
LAKE SENSITIVITY
TO ACID RAIN
(Based upon Calcium and Alkalinity
Data collected 1977-1983 inclusive)
KEY
October 1984
PACIFIC
OCEAN
PRINCE RUPERT
PRINCE GEORGE
QUESNEL
WILLISTON
LAKE
PEACE
RIVER
FRASER
RIVER
KAMLOOPS
OKANAGAN
LAKE
KELOWNA
PENTICTON
NELSON
KOOTENAY
LAKE
KOOTENAY
RIVER
CALGARY
HARRISON
VANCOUVER
QUEEN
CHARLOTTE
SOUND
HECATE
STRAIT
JUAN DE FUCA STRAIT
COLUMBIA

FIGURE 5

Distribution of lakes in British Columbia by each sensitivity rating characteristic (1977 - 1985).



Province of British Columbia
FIGURE 6
REGIONAL BOUNDARIES
FOR THE
MINISTRY OF ENVIRONMENT
August, 1984
Regional Boundary and Number —3
Regional Centre
Sub Regional Centre
NORTHERN
5
SOUTHERN INTERIOR
3
VANCOUVER ISLAND
1
LOWER MAINLAND
2
KOOTENAY
4
PACIFIC
OCEAN
QUEEN CHARLOTTE SOUND
DIXON ENTRANCE
PRINCE RUPERT
PRINCE GEORGE
QUESNEL
KAMLOOPS
KELOWNA
VERNON
PENTICTON
VICTORIA
NANAIMO
VANCOUVER
CALGARY
SASKATCHEWAN
COLUMBIA
BELLINGHAM

6

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References Cited

Saskatchewan Research Council. Evaluation of the Status of Surface Water Sensitivity Mapping for Acidic Deposition in Western Canada. Prepared for Technical Committee Western Canada Long Range Transport of Atmospheric Pollutants by Coordinating Committee on Surface Waters. SRC Publication No. C-805-11-E-82. February 1982.

VANCOUVER ISLAND REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Alice	7.2	8.5	24.6	Low
Bear Creek Res.	6.8	1.7	7.1	High
Beaver	7.1	4.8	18.8	Mod
Beck	7.5	23.8	93.5	Low
Benson	7.5	9.6	26.7	Low
Blackburn	7.3	12.1	38.0	Low
Blackjack	7.0	5.6	21.1	Mod
Blenkinsop	7.6	29.3	101.2	Low
Blinkhorn	7.1	----	23.6	Low
Bonanza	7.1	3.3	14.7	High
Brannen	7.3	6.0	18.6	Mod
Bullocks	7.3	11.9	34.8	Low
Buttle	7.3	8.9	24.6	Low
Cameron	7.6	12.2	35.8	Low
Campbell	7.2	7.0	20.0	Mod
Cathers	7.4	----	----	High*
Cheewhat	6.8	----	----	High*
Chehalis	6.8	2.0	7.5	High
Comox	7.4	5.2	18.6	Mod
Cowichan	7.2	7.2	20.1	Mod
Crest	7.1	4.2	15.0	Mod
Cusheon	7.5	10.1	26.1	Low
Daisy Res.	7.3	8.3	21.5	Low
Doobah	6.7	1.6	5.3	High
Durrance	7.9	21.4	65.1	Low
Echo	8.1	42.7	100.1	Low
Elk	8.3	15.6	51.4	Low
Elsie	6.9	4.0	14.1	Mod
Florence	7.6	19.2	65.0	Low
Flume	7.1	6.9	23.4	Mod
Ford	7.6	13.1	37.7	Low
Fork	6.8	4.8	14.8	Mod
Fuller	7.1	3.8	11.4	High
Fulmore	6.4	1.2	4.2	High
Glen	7.5	13.9	----	Low
Glinz	7.2	3.4	14.0	High
Great Central	6.9	5.1	14.7	Mod
Green	7.1	10.6	26.8	Low
Heal	7.6	18.1	48.1	Low
Henderson	6.7	3.2	8.9	High
Hobiton	6.7	1.9	6.6	High
Holyoak	6.8	1.1	4.6	High
Horne	7.3	9.8	29.7	Low
Ida	7.4	6.9	20.7	Mod
Jarvis	6.6	0.9	5.2	High
John Hart	6.8	6.4	19.2	Mod
Kennedy	6.8	3.6	10.8	High

VANCOUVER ISLAND REGION

LAKE NAMES	PH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Keta	6.5	1.6	5.6	High
Langford	8.1	18.5	55.6	Low
Lapan	6.4	1.2	3.8	High
Larry	6.2	1.0	4.1	High
Lizard	7.1	3.4	12.3	High
Long	7.3	9.3	25.3	Low
Lower Campbell	6.9	6.4	17.6	Mod
Lower Drum	7.3	2.9	11.1	High
Maggie	7.4	3.3	10.0	High
Magic	7.8	13.4	55.5	Low
Maltby	6.9	10.4	24.6	Low
Maxwell	7.6	5.2	15.9	Mod
McKay	6.7	----	----	High*
Mesachie	7.3	4.3	16.6	Mod
Myles	6.5	4.0	12.0	Mod
Nahmint	7.1	6.7	20.6	Mod
Nimpkish	7.0	2.8	13.1	High
Nitinat	7.8	141.0	56.7	Low
Old Wolf	6.5	1.6	7.2	High
Oliphant	6.5	5.8	17.1	Mod
Philips	6.4	0.9	4.4	High
Pike	6.9	8.6	22.9	Low
Poiorier	6.7	3.0	12.6	High
Powell	6.6	1.0	4.8	High
Prospect	7.4	9.0	29.5	Low
Quarantine	6.9	4.1	10.9	Mod
Quennell	8.2	----	----	Low*
Reinhart	7.4	----	----	High*
Richard	6.9	----	----	High*
Roe	7.6	15.6	54.5	Low
Round	6.8	----	----	High*
Shaw	7.2	9.2	34.2	Low
Shawnigan	7.4	5.4	17.2	Mod
Sherwood Pond	7.9	97.9	123.0	Low
Silburn	6.2	3.6	10.7	High
Snakehead	7.5	----	----	Low*
Songhees	6.1	0.6	3.1	High
Spectacle	7.0	4.0	13.0	Mod
Sproat	7.1	8.6	25.2	Low
St. Mary	7.6	9.0	30.8	Low
Stocking	6.9	3.0	10.2	High
Stowell	6.9	8.4	23.1	Low
Swan	8.0	40.4	----	Low
Teanook	7.1	9.4	24.4	Low
Tom Browne	6.5	1.2	4.9	High

VANCOUVER ISLAND REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Tsusiat	6.4	1.3	4.4	High
Tugwell	6.6	0.9	4.6	High
Upper Campbell	6.9	6.9	20.5	Mod
Upper Drum	7.2	3.8	14.2	High
Upper Quinsam	6.8	7.1	16.2	Mod
Upper Thelwood	6.8	1.0	3.9	High
Victoria	7.0	3.2	13.2	High
Volcano	----	12.4	----	Low
Weston	6.9	11.3	29.5	Low
Westwood	6.9	2.7	9.8	High
Woss	7.0	2.2	10.9	High
Wrigglesworth	7.5	11.8	35.0	Low
Young	7.0	2.9	15.5	High

* Sensitivity estimated on basis of pH.

LOWER MAINLAND REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Acta	7.4	13.0	16.6	Mod
Alouette	6.6	1.1	3.8	High
Alpha	7.1	6.6	17.2	Mod
Alta	6.9	11.8	15.0	Mod
Anderson	7.8	15.3	50.9	Low
Blaney (UBC)	6.7	2.0	5.2	High
Burnaby	7.0	15.0	40.0	Low
Carpenter	7.7	9.3	33.9	Low
Cheakamus	7.0	5.7	14.4	Mod
Chilliwack	6.8	3.1	7.7	High
Coquihalla Pond	7.1	3.1	8.4	High
Coquihalla-1	6.8	3.7	11.5	High
Cultus	8.0	26.8	63.0	Low
Daisy Res.	7.4	4.8	13.9	Mod
Davis	8.2	44.5	163.0	Low
Dodd	6.7	2.2	7.6	High
Eunice (UBC)	6.6	1.4	3.9	High
Fire	7.5	14.9	30.3	Low
Glacier	6.8	4.2	8.4	High
Green	7.4	9.0	23.0	Low
Green (0300203)	7.1	18.7	----	Low
Gwendoline (UBC)	6.7	1.5	4.4	High
Harrison	7.5	5.7	16.0	Mod
Haslam	6.8	----	7.8	High
Hatzic	7.4	7.1	25.3	Mod
Hayward	6.8	----	----	High*
Holden	7.8	9.3	29.3	Low
Horseshoe	6.8	1.7	6.9	High
Jacobs (Marion)	6.6	1.7	5.6	High
Kenyon	5.4	0.4	1.9	High
Kwotlenomo	8.5	26.2	130.0	Low
Lillooet	7.3	7.7	21.9	Mod
Lois	6.7	1.8	6.4	High
Lookout	6.9	3.7	12.3	High
Lost	7.5	9.8	23.2	Low
Lower Joffre	6.8	4.5	12.7	Mod
Mosquito	6.9	11.9	25.5	Low
Nita	7.1	6.1	14.0	Mod
Pitt	6.9	2.2	6.4	High
Placid (UBC)	6.6	1.8	4.6	High
Powell	6.6	1.0	4.7	High
Rolley	6.6	1.9	5.3	High
Sayers	6.7	1.1	3.9	High
Squeah	7.0	3.3	11.5	High
Stave	6.6	1.2	4.5	High
Sukinav	7.4	5.2	17.6	Mod
Twin East	6.4	1.9	5.3	High
Twin West	6.2	0.9	3.8	High

LOWER MAINLAND REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
UBC #1	5.8	0.9	2.5	High
UBC #2	6.2	1.6	4.0	High
UBC #3	6.1	1.2	3.3	High
West Kawkawa	7.8	11.4	38.7	Low

* Sensitivity estimated on basis of pH.

SOUTHERN INTERIOR REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
130 Mile	8.5	----	----	Low*
Allison	8.3	42.0	158.9	Low
Anahim	9.3	6.6	56.4	Mod
Beaver	8.7	30.3	209.7	Low
Birkenhead	6.5	4.5	38.7	Mod
Blue	8.2	38.9	312.5	Low
Boar	8.5	32.1	31.9	Low
Boldue	7.7	26.4	78.6	Low
Bose	7.8	----	----	Low*
Boss	8.3	29.7	123.0	Low
Bowers	8.6	42.2	175.0	Low
Brenda	6.8	3.0	9.6	High
Burnell	8.1	----	----	Low*
Carpenter	7.3	10.5	34.0	Low
Chain	---	18.0	66.5	Low
Chantslar	8.5	25.9	132.0	Low
Chapperon	9.3	15.4	95.8	Low
Charlotte	6.7	3.7	15.5	High
Chaunigan	8.4	28.8	111.9	Low
Chilko	6.7	8.4	20.5	Low
Chimney	8.9	15.6	473.0	Low*
Choelquoit	8.7	32.3	237.3	Low
Clearwater	8.0	16.3	78.1	Low
Coldscaur	8.2	15.9	59.6	Low
Conkle	7.2	3.7	16.9	High
Crooked	7.3	4.5	11.7	Mod
Crown	8.3	38.9	143.0	Low
Cup	7.3	6.5	14.3	Mod
Demers	8.3	57.0	150.0	Low
Douglas	8.0	14.6	63.6	Low
Downton	7.2	6.9	26.2	Mod
Dragon	8.3	30.5	122.0	Low
Dunn	7.6	7.4	26.7	Mod
Dutch	8.4	21.5	96.9	Low
E. Hatfield	8.5	----	----	Low*
Eagle	8.6	27.9	184.4	Low
East King	7.8	24.2	78.1	Low
Echo	7.9	41.7	94.2	Low
Elkin	6.9	9.3	30.7	Low
Ellison	8.3	13.2	59.5	Low
Eveline	8.9	17.6	611.5	Low
Felker	9.0	46.0	138.0	Low
Fifteen Mile	7.6	9.4	36.8	Low
Finney	8.3	22.6	97.7	Low
Fishem	6.9	16.3	39.3	Low
Fishem (Upper)	7.6	21.5	68.8	Low
Fletcher	8.6	31.5	128.9	Low
Forest	8.6	28.5	496.0	Low
Gardom	7.8	50.0	140.5	Low

SOUTHERN INTERIOR REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Garnet	8.3	55.4	189.0	Low
Glacier	6.8	1.4	7.5	High
Gladstone	7.7	49.2	278.0	Low
Goat	6.8	1.9	7.4	High
Green	8.1	36.9	135.0	Low
Gun	7.9	14.5	60.4	Low
Hawkins	8.2	23.9	101.0	Low
Hendrix	7.4	7.0	22.9	Mod
Holstein	7.9	27.7	68.9	Low
Horn	8.5	41.7	125.9	Low
Horse	8.3	----	----	Low*
Hydraulic	6.4	3.8	13.7	High
Idleback	6.7	1.7	10.0	High
Ivey	8.0	25.1	46.1	Low
Jacko	8.2	59.3	247.0	Low
Jewel	8.4	19.9	72.2	Low
Joan	7.2	4.5	13.9	Mod
Kalamalka	8.4	35.0	146.0	Low
Keefer	7.7	11.2	33.7	Low
Knox	9.0	19.3	392.6	Low
Konni	8.4	34.0	116.4	Low
Kostal	6.9	2.3	9.7	High
Lac La Hache	8.6	25.2	128.0	Low
Lac La Jeune	8.4	37.3	140.5	Low
Ladyslipper	6.7	1.3	8.0	High
Laird	8.4	53.0	166.0	Low
Lake of Woods	6.9	1.7	8.9	High
Lassie	7.5	12.7	23.3	Low
Lastman	8.0	66.5	80.8	Low
Link	---	15.1	59.0	Low
Little Horsefly	7.8	----	56.8	Low
Little Shuswap	7.6	13.6	376.4	Low
Logan	8.5	49.2	423.0	Low
Long	8.8	19.2	241.0	Low
Loon	8.8	23.2	296.0	Low
Mabel	7.9	15.1	----	Low
MacDonald	6.8	2.0	9.5	High
Mamit	8.5	45.0	----	Low
Mara	7.9	15.6	----	Low
Martin	9.0	21.3	329.0	Low
McConnell	8.1	34.1	149.0	Low
McCulloch Res.	7.0	3.5	13.1	High
McDougall	7.0	4.6	13.7	Mod
McGillivray	7.0	3.1	12.6	High
McIntosh	8.1	17.6	85.0	Low
McKinley	7.9	14.5	44.4	Low
McKinley Res.	7.4	7.6	29.0	Mod
Middle	7.5	20.4	50.1	Low
Milburn	7.9	23.7	91.2	Low

SOUTHERN INTERIOR REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Mink	6.6	4.5	20.6	Mod
Missezula	---	----	151.0	Low
Momich	7.2	4.1	15.9	Mod
Monashee Pond	8.2	33.5	117.0	Low
Monte	8.1	18.2	110.3	Low
Mud	6.8	4.0	7.2	High
Murtle	6.8	2.6	8.4	High
N. Barriere	7.6	6.2	21.1	Mod
N. Poison	8.5	15.7	158.0	Low
Nazko	8.7	36.2	241.0	Low
Ned Roberts	8.3	29.5	170.0	Low
Nickel Plate	7.2	3.1	11.5	High
Nicola	8.2	23.2	96.4	Low
Nimpo	8.2	13.2	97.8	Low
Nipet-Twin Lake East	8.7	27.5	226.0	Low
Niskonlith	8.1	28.9	76.6	Low
Okanagan	8.4	33.4	123.0	Low
One Eye	6.9	14.0	38.6	Low
Osoyoos	8.3	32.5	----	Low
Osprey	---	18.0	65.0	Low
Otter	7.6	21.9	72.3	Low
Oyama	6.9	4.3	16.6	Mod
Palmer	8.7	24.0	151.2	Low
Pass	8.8	17.1	451.0	Low
Paul	8.3	41.5	163.4	Low
Pavilion	8.4	40.7	148.0	Low
Peachland	7.8	22.9	47.0	Low
Pennask	7.6	6.5	22.2	Mod
Phinetta	7.9	27.6	98.0	Low
Pinaus	8.9	15.1	73.9	Low
Poison #1 (south)	8.4	19.0	140.0	Low
Providence	7.8	61.0	108.7	Low
Puntchesakut	7.8	11.5	57.6	Low
Puntzi	8.8	26.7	265.0	Low
Pyper	8.6	41.2	165.0	Low
Pyramid	6.9	1.8	9.9	High
Quiniscoe	6.9	1.6	9.7	High
Ray	7.0	3.8	11.1	High
Red	8.5	32.5	290.0	Low
Redfish	6.6	5.4	18.8	Mod
Roe	7.8	----	----	Low*
Roserim	8.0	----	153.4	Low
Sapeye	8.2	28.8	86.1	Low
Scout	6.6	0.4	6.2	High
Seton	7.4	10.5	34.6	Low
Shuswap	7.9	13.6	----	Low
Six Mile	8.6	30.9	359.5	Low
Sixteen Mile	7.7	8.7	32.2	Low
Skaha	8.4	30.6	107.5	Low

SOUTHERN INTERIOR REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Sneezie	8.2	42.5	147.0	Low
Soap	9.1	----	----	Low*
Souran	8.2	68.8	183.0	Low
St. Thomas	6.4	2.6	13.5	High
Stum	8.5	24.2	161.1	Low
Stump	9.0	8.5	320.1	Low
Sugar	7.7	9.2	----	Low
Sulphurous	8.3	----	147.0	Low
Tahla	8.2	39.7	153.0	Low
Tanilkul	8.7	29.0	207.2	Low
Taseko N.	6.5	7.4	15.1	Mod
Taseko S.	6.5	4.4	10.6	Mod
Tatla	8.8	19.5	294.1	Low
Tatlayoko	6.9	18.0	36.3	Low
Temapho	8.9	31.1	296.0	Low
Ten Mile	7.9	8.5	37.7	Low
Three Valley	7.5	8.4	22.9	Low
Tsuniah	7.5	18.0	51.7	Low
Tum Tum	7.2	4.9	11.5	Mod
Tunkwa	8.8	29.3	208.5	Low
Tuzcha	7.9	23.2	68.8	Low
Tyaughton	8.4	33.9	138.8	Low
Tyee	8.4	31.4	172.0	Low
Valerie	8.4	66.0	187.0	Low
Vedan	6.7	8.0	26.9	Mod
Venables	8.5	39.6	476.0	Low
Watson	9.2	----	----	Low*
West King	7.9	26.5	81.0	Low
White	8.3	41.9	128.8	Low
Wilgress	8.2	55.7	134.0	Low
Williams	8.8	30.7	293.4	Low
Wood	8.5	26.0	138.0	Low
Zero	7.0	6.4	20.5	Mod

* Sensitivity estimated on basis of pH.

KOOTENAY REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
14 Mile	8.4	35.3	200.7	Low
Aid	8.1	28.5	122.0	Low
Alces	8.4	44.1	127.0	Low
Baird	6.8	24.5	16.6	Mod
Baynes	8.1	----	----	Low*
Bittern	8.3	51.3	239.6	Low
Blackwater	8.2	37.8	136.0	Low
Bridal	7.2	4.6	13.6	Mod
Cerulean	8.0	----	77.4	Low
Champion #1	7.3	34.6	81.4	Low
Champion #2	7.2	24.4	58.9	Low
Champion #3	7.1	24.1	57.9	Low
Champion #4	7.9	13.8	41.4	Low
Cherry	7.5	22.5	76.3	Low
Christina	7.8	9.9	32.0	Low
Columbia	8.5	31.6	128.0	Low
Comfort	8.2	38.9	144.0	Low
Edwards	8.5	----	----	Low*
Elizabeth	7.7	----	----	Low*
Emerald	8.4	29.1	103.0	Low
Eohippus	7.3	----	----	Mod*
Fortress	7.9	21.5	67.6	Low
Gavia #1	8.6	35.9	274.8	Low
Gavia #2	8.4	33.9	251.2	Low
Gavia #3	8.1	43.4	318.4	Low
Gog	8.2	----	----	Low*
Grave	8.0	----	156.0	Low
Grizzly	7.6	----	----	Low*
Help	8.1	27.1	120.0	Low
Hobo	8.2	58.5	251.2	Low
Jim Smith	8.6	44.7	212.0	Low
Kearns	7.7	47.5	95.5	Low
Kiakho	7.6	18.2	68.5	Low
Koocanusa	8.2	31.0	95.0	Low
Kootenay	8.1	----	68.0	Low
Larix	8.1	----	----	Low*
Lassie	7.2	4.8	----	Mod
Lower Arrow	8.0	14.8	43.1	Low
Magog	7.9	----	61.3	Low
McNaughton-Kinbasket	7.9	19.5	----	Low
Mica Res.	7.9	19.3	----	Low
Mineral	7.9	57.1	213.9	Low
Mitten	8.4	43.4	215.6	Low
Moyie	7.4	4.2	17.5	Mod
Nancy Green	7.8	8.9	31.6	Low
Ninebay	8.6	29.8	290.9	Low
Nixon	8.1	30.1	128.0	Low
North Star	8.1	----	227.0	Low
O'Hara	8.0	10.3	38.3	Low

KOOTENAY REGICN

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Og	7.9	----	----	Low*
Premier	8.6	27.7	161.0	Low
Rock Isle	7.5	----	----	Low*
Slocan	7.8	12.3	36.0	Low
St. Mary	7.3	5.7	20.7	Mod
Summitt	8.2	----	134.0	Low
Sunburst	7.4	----	----	Low*
Suzanne	8.2	----	248.0	Low
Tie	8.3	44.5	240.0	Low
Trout	8.0	15.0	40.7	Low
Upper Arrow	7.9	14.7	50.7	Low
Wapta	8.3	18.5	69.4	Low
Wasa (Hanson)	8.6	29.7	207.0	Low
Wedgwood	8.0	----	----	Low*
Whiskey	8.4	38.8	163.3	Low
Whiteswan	8.4	36.2	118.0	Low
Wilbur	8.3	31.2	218.8	Low
Windermere	8.5	23.4	95.0	Low

* Sensitivity estimated on basis of pH.

NORTHERN REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Aconitum	7.2	3.6	13.1	High
Acorn	7.1	6.1	20.2	Mod
Aeroplane	8.3	44.2	231.5	Low
Aiken	7.3	8.8	22.6	Low
Alec Chief	8.0	32.2	111.5	Low
Alistair	6.3	1.2	5.4	High
Andy Bailey	7.8	22.6	68.3	Low
Atlin	7.8	14.2	49.9	Low
Augier	7.1	6.3	24.9	Mod
Azouzetta	8.1	24.0	70.1	Low
Babine	7.4	10.8	37.5	Low
Barney	8.5	49.5	193.0	Low
Batchellor	5.9	0.2	2.4	High
Beal	7.4	----	14.5	Mod
Beaver	8.1	35.0	139.4	Low
Bednesti	7.7	13.8	69.8	Low*
Bell	8.0	30.0	93.8	Low
Berman	7.9	----	----	Low*
Bigelow	7.1	12.1	47.2	Low
Birches	8.6	33.8	265.7	Low
Bob Quinn	7.4	32.9	63.5	Low
Bonney	6.9	3.4	11.5	High
Boomerang N.	8.0	39.9	132.7	Low
Boomerang S.	6.9	10.1	34.5	Low
Boot	8.3	31.1	107.0	Low
Border	6.8	8.0	31.4	Mod
Bow	7.9	----	----	Low*
Bowser	7.7	14.9	36.8	Low
Boya	8.3	49.2	156.0	Low
Buckinghorse	7.9	13.9	42.6	Low
Buckley	8.1	11.8	82.4	Low
Buckley Pt.	6.2	0.6	3.5	High
Burden	8.1	34.2	115.5	Low
Burns	7.5	12.0	46.6	Low
Butte	7.3	4.8	24.3	Mod
Butterfly	8.3	----	----	Low*
Byers	8.0	----	----	Low*
Camp	7.9	----	----	Low*
Canyon	7.8	14.0	43.9	Low
Carina	7.8	----	----	Low*
Carl	7.7	15.7	52.2	Low
Cartmel	7.3	9.7	23.9	Low
Chapman	7.0	6.6	24.3	Mod
Chara	7.8	30.2	112.1	Low
Charlie	---	15.6	----	Low
Chesterfield	8.4	43.0	132.5	Low
Chief	8.0	9.1	37.3	Low
Chinaman	8.1	16.0	65.0	Low
Chismania	7.9	23.5	96.3	Low

NORTHERN REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Christina	7.1	4.4	17.7	Mod
Chuchi	7.8	10.0	34.3	Low
Chukachida	7.5	10.6	27.8	Low
Circle	7.5	----	----	Mod*
Clam	7.1	----	----	High*
Cold Fish	7.9	17.7	43.7	Low
Coles	7.9	27.0	54.5	Low
Collins	6.6	4.7	16.5	Mod
Cow	7.8	21.5	67.5	Low
Crab	6.3	1.0	4.5	High
Cry	7.4	----	----	Low*
Dahl	7.8	11.4	67.7	Low
Dall	7.9	12.8	41.0	Low
Davie	7.3	11.3	37.5	Low
Davis	6.7	1.1	4.1	High
Deadwood	8.4	----	182.0	Low
Dease	8.3	29.7	101.0	Low
Deception	6.9	13.5	34.9	Low
Decker	7.4	11.2	42.5	Low
Deep	6.5	----	----	High*
Denetiah	8.2	29.4	84.0	Low
Desiree	7.0	33.0	64.3	Low
Dina	7.9	22.7	81.5	Low
Dixie	7.7	----	35.0	Low
Dominion	7.2	----	----	Mod*
Dunalter	6.9	8.4	29.7	Low
E. Niska	6.7	2.6	10.7	High
Eaglehead	7.5	7.2	30.3	Mod
Ealue	8.5	51.0	149.0	Low
Ecstall	6.8	3.6	8.9	High
Ed Bird	8.2	43.4	----	Low
Eddontenajon	8.4	38.2	110.0	Low
Eena	7.1	----	----	Mod*
Ekwan	7.9	44.2	74.9	Low
Ella	7.9	16.1	43.6	Low
Elwin	7.2	11.3	52.7	Low
Elwin	7.7	9.9	52.1	Low
Estsine	8.4	34.6	86.3	Low
Etthithum	7.4	13.1	53.8	Low
Eutsuk	6.7	3.6	14.5	High
Fern	8.1	38.5	105.0	Low
Firth	7.4	8.8	34.5	Low
Firth	8.3	34.4	123.5	Low
Fishing	8.2	66.1	194.0	Low
Fission	6.7	5.5	16.4	Mod
Forcier (Blue)	8.2	47.9	156.5	Low
Francois	7.8	----	----	Low*
Frank Ogilve	6.5	0.7	4.6	High

NORTHERN REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Fraser	8.2	12.2	44.9	Low
Fred Wright	6.9	3.6	12.0	High
Fredrikson	6.6	4.6	15.0	Mod
Gamble	5.8	0.2	2.4	High
Germansen	7.6	14.4	42.8	Low
Gladys	6.6	----	5.1	High
Gladys	7.9	10.6	37.4	Low
Goodhope	8.3	51.4	147.0	Low
Goosly	7.2	11.6	30.0	Low
Graveyard	8.5	51.1	1.9	Low
Grizzly	7.4	10.4	49.1	Low
Haggen #1	5.9	1.0	4.9	High
Haggen #2	7.5	53.6	240.0	Low
Haggen #3	6.3	3.1	23.0	High
Haggen #4	6.4	2.0	7.3	High
Haggen #5	6.1	1.4	10.7	High
Halfmoon	8.1	21.6	65.4	Low
Hall	7.8	11.9	45.3	Low
Happy	8.0	14.0	49.0	Low
Hard	7.0	2.8	11.2	High
Haworth	8.3	36.7	91.9	Low
Hayward	6.2	0.4	2.7	High
Helen	7.6	25.6	69.8	Low
Hilltout	7.3	10.3	20.7	Low
Hlvey	7.0	----	186.0	Low
Hodkin	6.5	3.7	11.0	High
Horneline	8.3	53.3	173.0	Low
Horseranch	8.3	36.9	187.0	Low
Hottah	6.9	----	----	Mod*
Indian	8.2	18.4	75.3	Low
Intada	7.8	13.6	45.3	Low
Island	7.3	5.8	18.9	Mod
Jennings	7.2	3.3	15.5	High
Jennings Lk.S.Basin	7.2	3.0	13.4	High
Johiah	6.8	3.3	12.3	High
Johnston	6.9	3.6	9.7	High
July	8.1	27.8	73.6	Low
Kaham	7.2	5.0	15.1	Mod
Kakiddi	7.4	24.5	71.9	Low
Kalum Rd Pond #1	5.7	0.2	1.7	High
Kathie	7.6	----	----	Low*
Kathlyn	7.1	7.0	19.9	Mod
Kazchek	7.8	20.8	67.0	Low
Kedahda	8.1	24.2	57.9	Low
Kelsall	6.9	3.1	11.4	High
Khtada	6.3	1.0	4.5	High
Kinaskan	7.9	26.9	74.2	Low
Kitchener	7.4	9.7	29.6	Low

NORTHERN REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Kitsumkulum	6.8	5.2	16.1	Mod
Kitwanga	7.8	13.9	51.1	Low
Klinket	7.5	7.0	28.9	Mod
Klinkit	7.6	7.9	29.3	Mod
Klock	7.8	21.7	68.7	Low
Klowee	7.7	15.2	42.1	Low
Klua East	8.3	16.7	26.8	Low
Klua West	8.0	21.8	57.0	Low
Kluachesi	8.4	49.5	165.0	Low
Kluachon	8.3	44.4	145.0	Low
Kluea	8.1	38.9	93.3	Low
Kotcho	7.0	21.6	33.4	Low
Kumealon	6.1	0.5	2.8	High
Kuthai	8.2	29.0	121.0	Low
Kwinageese	6.8	4.3	13.6	Mod
Kwokville	7.6	20.4	27.2	Low
Lachmach	6.0	0.7	3.1	High
Lady Laurier	8.5	41.4	164.0	Low
Laidman	7.5	11.4	32.2	Low
Lakelse	7.3	8.9	30.0	Low
Lava	6.9	3.5	11.4	High
Leverson	6.1	0.7	2.7	High
Lindeman	6.9	3.8	13.4	High
Little Bob Quinn	7.5	32.8	85.1	Low
Little Bobtail	8.0	15.1	89.2	Low
Little Dease	8.3	32.9	99.1	Low
Little Tatsamenie	8.0	24.3	65.3	Low
Little Trapper	7.8	19.4	46.6	Low
Long	5.9	----	----	High*
Long Mountain	8.0	----	121.5	Low
Looncry	8.2	48.5	134.0	Low
Lower	6.8	2.3	5.8	High
Lyon	7.7	----	----	Low*
Marie	6.8	4.2	12.2	Mod
Marion	6.2	0.8	3.4	High
Marion	8.8	34.0	112.0	Low
Mason	5.5	4.2	4.7	High
Mathors	6.2	1.4	4.7	High
Maxhamish	8.3	39.0	83.6	Low
Mayer	5.0	1.3	1.3	High
McBride	6.7	5.2	19.4	Mod
McDame	8.2	43.1	129.0	Low
McDowell	6.8	9.6	32.6	Low
McLeod	7.7	----	----	Low*
McQuarrie	7.9	13.8	42.0	Low
Meek	6.7	2.5	8.0	High
Mesantan	7.4	9.1	22.7	Low
Mess	8.1	26.0	98.1	Low

NORTHERN REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Meziadin	7.3	12.4	31.6	Low
Midwinter	8.0	22.4	59.5	Low
Milk	6.3	----	----	High*
Milo	7.2	10.2	24.0	Low
Moodie #1	8.5	36.2	194.0	Low
Moodie #3	8.3	46.4	213.2	Low
Moose	7.5	10.5	44.4	Low
Moose	8.1	18.0	64.9	Low
Moose	8.1	22.1	81.7	Low
Morchuea	8.2	29.9	100.7	Low
Morice	6.9	6.2	17.1	Mod
Mosquito	7.2	5.4	16.9	Mod
Mowchilla	7.6	21.5	61.2	Low
Mowdade	7.7	30.9	79.6	Low
Murch	7.6	----	----	Low*
Nanika	6.5	4.1	11.9	Mod
Nass	7.8	8.0	49.4	Low
Ndakdolk	6.4	0.8	3.6	High
Nellian	7.2	5.3	12.0	Mod
Ness	8.3	18.7	76.0	Low
Netson	8.1	56.9	187.0	Low
Nome	6.8	2.4	9.7	High
Nukko	8.0	8.9	35.9	Low
Nulki	8.1	16.6	81.0	Low
Nuttlude	7.4	19.4	60.5	Low
Odell	6.5	----	----	High*
Onion	6.3	0.9	2.8	High
Opatcho	7.9	----	----	Low*
Outaanetdey	7.4	12.3	22.8	Low
Pam	6.5	2.2	5.7	High
Parker	7.6	39.4	49.0	Low
Patry	7.2	9.8	18.1	Mod
Paul	6.9	4.5	13.4	Mod
Pelly	8.4	41.7	125.0	Low
Peter (Piper)	6.8	3.9	11.1	High
Pinchi	8.0	16.0	77.8	Low
Pine Tree	7.1	10.8	37.5	Low
Pinkut	7.2	7.6	28.6	Mod
Plantation	6.0	----	----	High*
Pondosy	6.6	5.2	15.6	Mod
Poorman	8.1	42.5	132.0	Low
Prairie	7.8	16.3	68.6	Low
Prudhomme	6.4	1.5	5.0	High
Punchaw	8.2	12.2	55.7	Low
Purden	7.4	----	----	Low*
Quality	8.3	36.3	146.0	Low
Quentin	8.1	35.2	84.2	Low
Rainbow	5.5	0.4	3.0	High

NORTHERN REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Rainbow	7.4	----	----	Mod*
Ridgeway	8.4	41.7	141.0	Low
Ritchie	7.7	24.8	68.9	Low
Ross	7.2	12.5	37.9	Low
Rossa-2 (Six Mile)	7.9	9.7	37.2	Low
Round (Lacroix)	8.5	26.0	113.0	Low
Sand	7.5	10.4	32.3	Low
Sawmill	7.5	----	----	Mod*
Saxton	7.7	----	----	Low*
Scoop	8.7	27.6	273.0	Low
Seeley	7.4	18.2	47.5	Low
Seymour	7.4	7.8	38.7	Mod
Shawatlan	7.0	3.2	9.2	High
Shiela	6.9	5.7	15.8	Mod
Skidegate	7.1	4.7	15.4	Mod
Skunk	7.9	----	----	Low*
Sloko	7.6	13.4	38.3	Low
Snake	7.6	32.7	79.4	Low
Solitary	8.5	35.4	207.2	Low
Sorensons Pond	8.4	----	174.0	Low
Spinel	8.2	31.4	85.3	Low
Stalk	7.3	8.2	21.4	Low
Stuart	7.6	12.6	44.2	Low
Sucker	6.8	2.2	14.0	High
Summit	8.4	25.3	115.0	Low
Summitt	7.1	----	----	Mod*
Surel	6.6	4.0	13.6	Mod
Surprise	7.7	6.9	35.8	Mod
Surprise	7.8	7.3	31.7	Mod
Sustut	7.5	12.1	32.2	Low
Swan	7.1	5.6	17.5	Mod
Swan	8.2	23.5	98.0	Low
Swans	7.4	7.7	38.3	Mod
Swift	7.7	9.7	35.5	Low
Tabor	8.1	20.7	70.6	Low
Tachick	8.2	20.0	99.0	Low
Tachilta	7.9	18.1	66.4	Low
Tahtsa	6.6	6.0	20.3	Mod
Takatoot	7.4	12.3	39.4	Low
Taltapin	7.4	9.2	36.6	Low
Tatlatui	7.3	13.8	22.0	Low
Tatogga	8.1	30.9	90.5	Low
Tatsamenie	8.0	25.6	67.8	Low
Tchentlo	7.8	10.6	39.0	Low
Tchesinkut	7.9	17.0	63.6	Low
Teigen	6.4	4.3	10.5	Mod
Telsa	6.6	5.0	15.5	Mod
Tetachuck	6.7	4.4	15.3	Mod
Thinahtea	7.9	36.2	87.5	Low

NORTHERN REGION

LAKE NAMES	pH	SENSITIVITY CHARACTERISTICS Calcium (mg/L)	Alkalinity (mg/L)	SENSITIVITY
Thirty Mile	8.1	18.4	86.0	Low
Thutade	7.3	8.5	20.1	Low
Tobin	7.9	----	----	Low*
Toboggan	6.3	4.3	8.2	High
Todagin	8.0	35.6	87.0	Low
Tom MacKay	6.4	2.8	9.4	High
Tomias	8.0	18.4	56.7	Low
Tootsee	7.3	6.8	25.5	Mod
Top	7.6	14.2	46.2	Low
Trout	7.7	8.1	27.6	Low
Trygve	7.6	10.6	30.8	Low
Tsayta	7.8	----	----	Low*
Tsenaglode	7.9	13.1	44.8	Low
Tucha	7.9	----	----	Low*
Tucho	6.9	----	----	Mod*
Tuchodi East	8.1	35.7	91.8	Low
Tuchodi West	7.9	40.9	82.7	Low
Tumeka	7.9	12.7	53.0	Low
Turnagain	8.3	31.1	93.1	Low
Turner	6.8	----	----	High*
Tutizzi	7.2	6.3	18.5	Mod
Twin Island	8.3	62.4	240.7	Low
Tyhee	8.2	35.1	128.1	Low
Unnamed #1 (1132407)	7.0	6.9	13.1	Mod
Unuk	6.7	8.4	16.3	Mod
Vallee	7.1	20.4	61.8	Low
Verdant	8.2	----	----	Low*
Victoria	8.0	18.6	84.8	Low
Vincent	8.3	31.2	133.0	Low
Vivian	8.2	----	----	Low*
W. Niska	6.7	2.8	13.2	High
Wedge	7.1	----	----	Mod*
Weissener	8.3	43.7	126.3	Low
West Nadsilnich	8.0	11.8	50.0	Low
Whitefish	7.6	15.0	47.1	Low
Whitesail	6.7	4.7	18.3	Mod
Williamson	----	11.0	----	Low
Williston Res.	7.8	15.3	53.0	Low
Wokkpash	8.2	19.6	68.5	Low
Woodcock	7.5	13.6	57.9	Low
Woodworth	6.6	2.9	8.7	High
Yakoun	6.6	2.3	6.6	High
Yehiniko	7.8	13.3	36.9	Low

* Sensitivity estimated on basis of pH.